

## TWO CASES OF BONE-GRAFTING FOR CRANIAL DEFECT.

By BURT LEANDER EASTMAN, M.D.,

OF BURLINGTON, KAN.

CASE I.—This case was treated in Cook County Hospital, Chicago. J. B., male, forty years old; history as follows:

Eight years ago was kicked by a horse, sustaining a compound comminuted skull fracture, involving part of the left half of the frontal bone. The wound suppurated, was a long time healing, and all the loose fragments sloughed out or were removed by the physician, leaving the injured area covered only by the skin. From that time this region has been pulsating, tender at all times, and at intervals the seat of a throbbing headache so severe as to disable him for days at a time. Within the last three years this periodical headache has grown so much worse that the patient is incapacitated from earning a livelihood on account of it. Four years ago he began to have what he called "blind spells," which grew slowly worse and finally developed into epileptic convulsions. These appear irregularly, seldom oftener than once in three weeks. While the patient is positive that he has these attacks, he makes little complaint, saying that if he could get rid of his headache, and the hole in his head would stop "beating," he would be very comfortable, even with the fits. He notices no aura, and close questioning fails to elicit anything in the onset or progress of this trouble that could be classed as a focal symptom. While in the ward he had one attack which was not seen by physician or nurse at the time, but was described as a "fit" by other patients.

*Examination.*—A large irregular scar three inches long in left frontal region, two inches above external angular process. Under the scar is a sunken area, one by three inches, in which the bone is lacking, the bottom being soft and pulsating visibly. Skin thin and adherent to underlying tissues and the whole area slightly tender to pressure. Examination of eyes, face, or limbs fails to show any paraly-

sis, paresis, or spasm of any muscle or set of muscles. The case was explained and patient readily chose the risk of the operation for the chance of being relieved of his almost constant headache and the perpetual throbbing in the defect.

*Operation.*—September 30, 1893, after twenty-four hours' application of soap and carbolized dressing to shaved scalp.

Ether; strict aseptic preparations; horseshoe incision five inches long and three wide, base at parietal eminence; apex one inch above left orbit. Skin dissected away from edges of gap in the skull and from underlying dura, and the flap turned back out of the way. The dura was then well loosened from the edge of the defect, opened, and loosened from cortex beneath. Then a pattern of the gap was cut from sterilized rubber tissue, placed on the bone adjacent, and marked with a chisel. With this as a guide, the incision was carried down to the diploë, and a piece of bone cut from the outer table and pried off. This was two and three-quarters inches long by one and a half wide at its middle, and nearly oval in shape. The graft fitted quite well, although of a little different curvature, and with some trimming it filled the defect nicely, the periosteum being taken with it.

The flap of scalp returned to place, drained with silk strands, and sutured. The operation was prolonged and rather bloody; little shock.

Wound healed by first intention; stitches removed on seventh day. Patient left three weeks later, and was lost sight of, and since then has never reported to the hospital that I can learn. When he left, the previously sunken, tender, and pulsating area was even with the adjacent scalp, and filled with firm bony structure. His headache had vanished and the pulsation was also gone; patient declared himself well.

CASE II.—S. G., farmer, aged twenty-four years. History: Seven years ago he received a shot at close range from a heavy calibre pistol, the bullet entering the left frontal region two inches above external angular process, and emerging from the right cheek just in front of the ascending ramus of the lower jaw.

Considerable brown matter oozed from the skull-wound during the next forty-eight hours, and there was considerable hæmorrhage from the nose, and of course from the mouth. A few spiculæ of bone were removed from the wound at the time, otherwise no interference. Both wounds healed in about three weeks, and patient was apparently

as well as ever. It is difficult to understand how the bullet missed both orbits and both optic nerves, but the patient has had no disturbance of vision whatever.

In 1893, five years after the injury, patient began to have attacks of vertigo, which speedily developed into epileptic convulsions. Two months after their appearance the site of the wound was trephined by an operator in a large Western city, and a one-and-a-half-inch button removed with the old perforation as a centre. This had been filled in with fibrous cartilage so thin as to be translucent. There was some roughening of the edges, and the operator said he also removed a spicula of bone which had been embedded in the dura. The wound healed nicely, except that a small abscess appeared in the scar three weeks later, and patient remained healthy and free from his epilepsy for sixteen months. Then the attacks recurred again, and soon became worse than ever. I saw him first in March, 1895. He was having the seizures at intervals of two or three weeks, each one lasting from six to thirty hours, during which time he had from three to eight convulsions.

Patient is a heavily-built, well-muscled man, quite intelligent, and not at all of a nervous type.

Two inches above and one inch behind the left external angular process is a stellate scar, two inches across, and beneath it is a circular depression, apparently one inch in diameter, with quite abrupt edges. Very slight tenderness in the scar; the bottom of this area is soft and pulsates visibly. Skin thin and adherent to edge and floor of the depression. Depressed and adherent scar in right cheek below malar bone, immediately in front of ascending ramus of the jaw. Convulsions as stated above; no headache; no eye symptoms; no paralysis.

Family history is that an aunt had convulsions from infancy, and is supposed to have died from this in early adult life.

Patient was put on moderate doses of bromides in two combinations, and the dosage increased as the stomach tolerated it until the characteristic eruption appeared. The seizures appearing as before, the bromides were pushed until the stomach, as well as the patient, rebelled.

Patient became discouraged after five months' medical treatment and demanded more radical measures, the success of the first operation convincing him that his relief must come, if at all, by another operation.

Assuming the case to be of traumatic origin, the intended opera-

tion was explained to patient and parents, with the attendant danger to life. No assurance was given of permanent or even temporary cure, but was accepted without delay.

Operation July 8, 1895. Soap and carbolized dressing previously applied to shaved scalp for twenty-four hours. While on the table, being cleaned up and awaiting the anæsthetic, patient had a typical moderately severe convulsion lasting probably half a minute. This complicated matters, but it was decided to go ahead. Ether well taken, but once during the operation there was a short period of apnoea with a very slight tremor of the muscles, and a marked darkening of the blood; this was taken to be another convulsion, masked and controlled by the anæsthetic. A horseshoe flap raised almost the same as in Case I, but smaller, and extending to left eyebrow.

Skin dissected from skull and dura and flap turned back. The dura was thoroughly loosened from the edges of the defect, then opened, and loosened from the cortex. From the dura was removed a large iron-dyed silk ligature from the previous operation. Cortex bled freely, but the cicatrix could not be defined by any difference in color or consistence, hence no cortex was removed. With a one-and-a-quarter-inch trephine a button was cut from the outer table just behind the old wound. This was reversed and placed in the defect with the pericranium on the dura, and its rough surface from the diploë next the skin-flap above.

It was expected there would be some ingrowth of bone in the old trephine-wound and that a one-and-a-quarter-inch button would be fully large enough. This was not the case at all, and the transplanted section did not fit as snugly as might be wished. Hæmorrhage from cortex and diploë arrested with hot water and pressure. Flap sutured in place and silk drain left at its apex.

In the whole operation the hæmorrhage was profuse, prolonging the work considerably, but there was very little shock. During the next thirty-six hours he had five convulsions. Wound healed nicely except at the apex where the edges separated slightly, this possibly from tossing about in his convulsions. Stitches removed on seventh day; dressing worn for another week. One month later the bone is firm, immovable, and no pulsation visible or palpable, depression is very slight, not much greater than the difference in thickness of the scalp and old attenuated scar.

Patient felt well and in the best of spirits, beginning to feel free of the dread of his malady up till three days ago, nine weeks from

the operation, when convulsions recurred, fully as severe as before, having six in eight hours.

*Remarks.*—So far as the epileptic element is concerned, the results in these cases are not encouraging. The value of Case I is negative, owing to the entire lack of subsequent history, a condition which is common in hospital cases.

In Case II the result is discouraging, not being equal to that obtained from the previous operation two years before, and might be well criticised. But, leaving the epilepsy out of consideration, these cases illustrate a method of filling bony defects in the skull which to me seems better in many ways than that of using silver, lead, celluloid, or tin-foil plates, or rubber tissue. This natural plate is far more likely to remain in place without suppuration, and in any case affords as good protection as the others.

When the healing is aseptic and the transplanted plate becomes apparently a part of the contiguous skull, the result is certainly ideal, both in affording protection to the underlying soft tissues and in its cosmetic effect.

What is the ultimate fate of such transplanted bone? Does it remain in the tissues as an aseptic, non-irritating foreign body liable to be absorbed at any future time, or does it become vitalized and resume its life and function as bone, again to remain bone and nothing else?